



The University of Iowa

Creating Partnerships Across Iowa in Economic Development

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Overview of Presentation

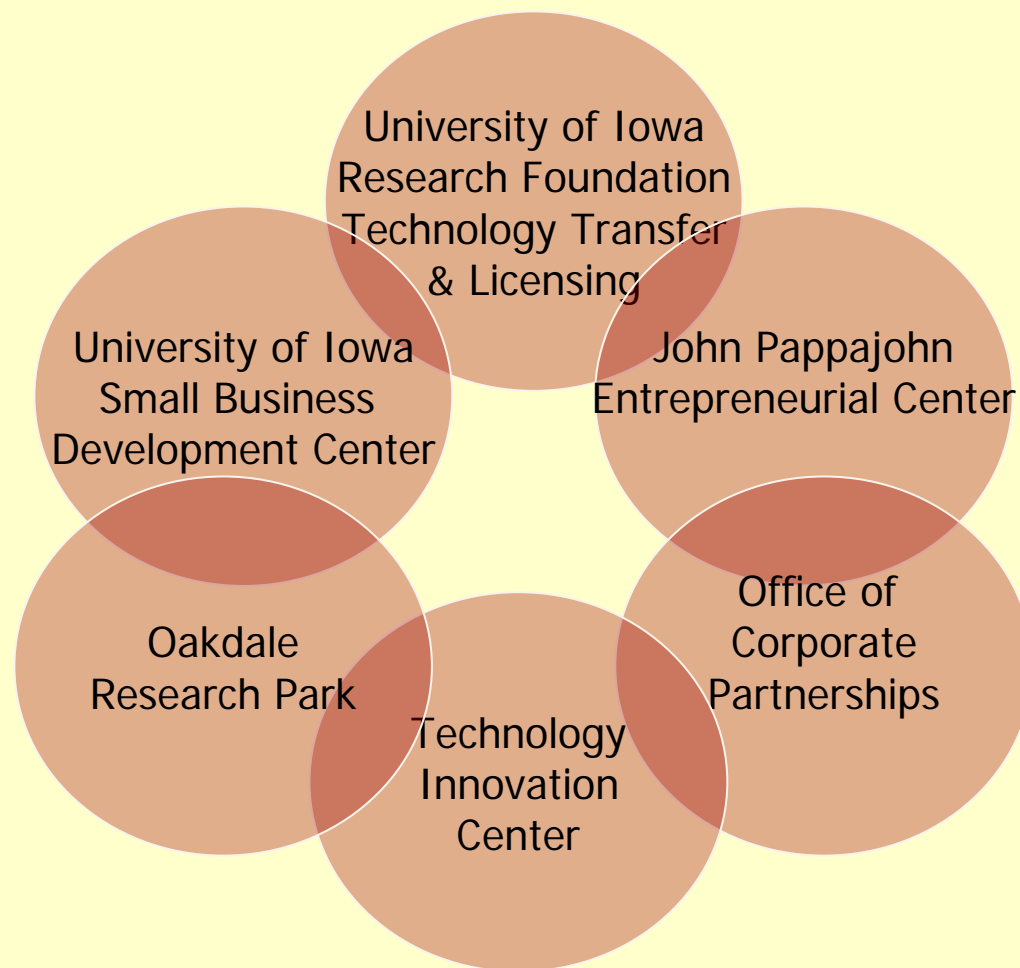
- ✦ Overview of Programs
 - ✦ IOWA Centers for Enterprise
 - ✦ Oakdale Research Park
 - ✦ Technology Innovation Center
 - ✦ Center for Advanced Drug Development
- ✦ Review of GIVF and Battelle Projects
- ✦ Highlighted Projects
 - ✦ National Genecular Institute (NGI) and Life Sciences Technology Incubator: A Public-Private Partnership
 - ✦ SANTOS – Virtual Soldier Project





What are the IOWA Centers for Enterprise ?

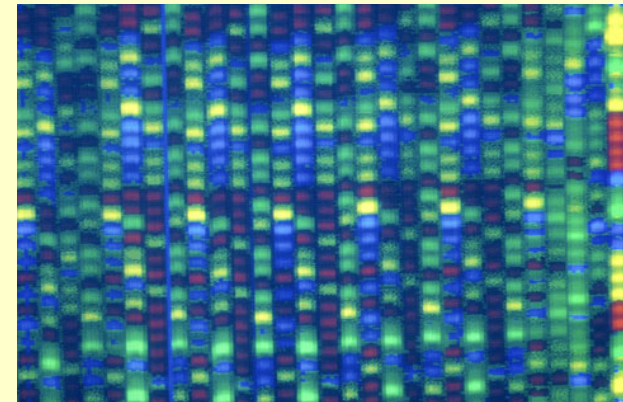
- An integration of existing economic development activities at The University of Iowa
- Providing a comprehensive program that promotes economic development and technology transfer.
- Housed together in new facilities at center of the campus, improving access and integration of services.





University of Iowa Research Foundation

- ✦ Non-profit organization that manages UI intellectual property for the benefit of UI, inventors and the public
- ✦ Portfolio of ~1000 technologies (25% licensed)
- ✦ 80 invention disclosures per year
- ✦ Re-invigorating start-up company formation
- ✦ 15 new "pre-companies" or companies





Success Story – Optherion



New Iowa biotech company to build on UI technology to **treat macular degeneration**, with an **estimated billion-dollar market** - is expected to be in operation in Spring 2007, with eight corporate jobs and an additional 12 in a closely affiliated academic laboratory.

- R & “early” D to be co-located with Dr Hageman’s academic lab in Iowa.
- University of Iowa has already identified and building out facilities.
 - Plan to recruit top level scientific discovery team to the Company.
 - In discussions for Pre Phase III manufacturing also in Iowa.



How are the Economic Development Appropriations used at the University of Iowa?

- The total Economic Development Appropriation in FY2007 to The University of Iowa was \$247,005.

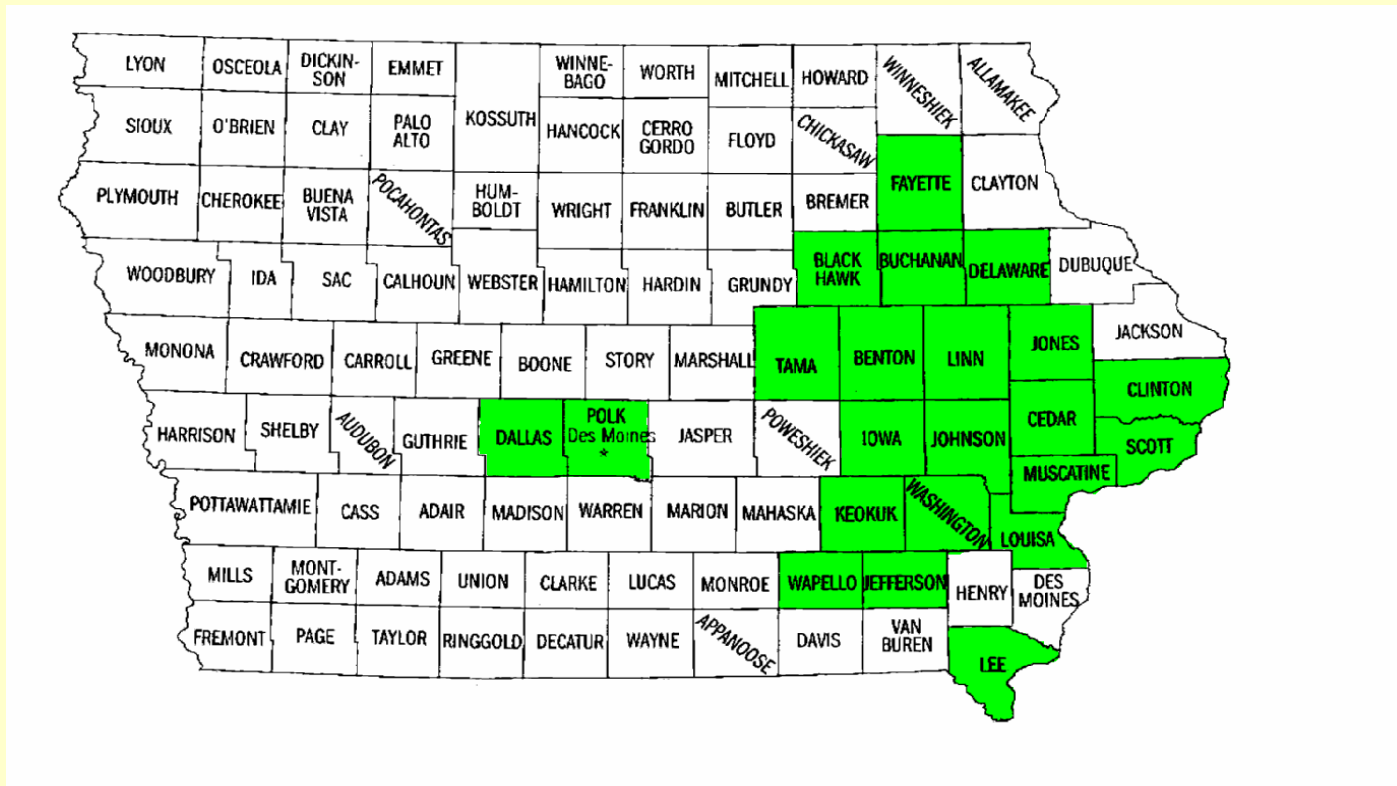
These funds provide part of the support we need for:

- Operation of a **Technology Incubation Center (TIC)** and **Oakdale Research Park (ORP)** where new businesses can be established.
- Operation of one important “magnet laboratory” - **Center for Advanced Drug Development (CADD)** that is of special interest to attracting and supporting biotech and pharmaceutical companies.



- **Forty active Iowa companies** are affiliated with the research park and innovation center.
- These companies employ **over 1,500 employees** earning an average salary of **nearly \$60,000**.
- Importantly, the employees within these companies represent **a labor-shed that includes 21 Iowa counties and 65 Iowa cities and towns** resulting in a regional labor shed covering approximately one-fifth of Iowa.

**FY07 Labor Shed for Affiliated Companies and Labs
UI Oakdale Research Park and Technology Innovation Center**





Emerging Entrepreneurial Management at Oakdale Research Park

- ✦ Park Board Manages University Buildings
- ✦ Use Outside Contractors for Services
- ✦ Build Revenue Stream to Support Long-term Sustainability of the Research Park
- ✦ Developing Marketing Plan to Promote Park
- ✦ Land Lease Structure to Support Long-term Sustainability



How are the GIVF Appropriations used at the University of Iowa?

- The total GIVF appropriation in FY2007 to The University of Iowa was \$1.925M.

These funds provide part of the support we need for:

- IOWA Centers for Enterprise
- New Business Startups support; Gap funds
- Infrastructure support –
 - Optherion
 - Center for Biocatalysis and Bioprocessing, cGMP facility
 - New Technology Incubator



GIVF investments are being made across two distinct and interdependent phases.

Phase 1: Immediate or short term needs designed to directly facilitate university-private sector partnerships in entrepreneurship and the creation of new companies and jobs in Iowa.

Phase 2: Middle to long term commitments needed to promote and sustain high tech entrepreneurship in the region and build new networks of technical-financial-business capabilities.



Phase I Program: ISTART - Iowa Startup and Entrepreneurship (Gap) Fund (\$1,400,000).



This program supports a competitive request-for-proposals (RFP) process to identify and support commercialization projects based on the University's or partnering company's intellectual property. **This program targets businesses with high potential for recruitment or advancement in Iowa.**

Gap Funding Projects

- Low Cost Retinal Camera (iOptics)
- Non-invasive Glucose Detection for Diabetics (ASL Analytic)
- Drugs for Cancer Treatment (Terpenoid Therapeutics)
- Cell Therapy for Alzheimer's, Parkinson's and other diseases (RepGenix)
- Models to Study Cystic Fibrosis, Cardiovascular Disease
- Neurological Diseases and Cancer (Newco)
- Touch Screen Device (OMR Sensors)
- Breathalyzer for Glucose Monitoring (Znovation)

Gap Funding Success Story

- NIH to award ASL Analytical \$1M to develop noninvasive alarm for diabetics using UI sensing technology
- ASL Analytic will subcontract part of work to Arnold's UI laboratory
- NIH reviewers: "World class team...pioneers in infrared glucose monitoring...exceptionally well justified and rigorous research plan"
- ASL Analytical has raised angel investment for initial company operations



Progress to Date: ISTART Program

Progress:

Infrastructure: wet lab space renovation, cGMP facility, new Biotech Incubator

Outcomes:

✓ **Completion of cGMP facility** at CBB – magnet facility for new companies

✓ **New Biotech Company: Optherion**, 10-20 people hired in 1st 2 years, potential \$B market,

✓ Discussion of manufacturing facility in Corridor region

✓ **New Biotech Incubator** – public-private partnership development of start-up life sciences companies





Phase II Program: IGROW - Iowa Growth and Development Fund (\$525,000)

This program funds investment for long-term growth of Iowa-based businesses.

The university directs funds to promote high-tech entrepreneurship and build new networks among people with technical, financial, and business expertise and sustain the growth of industries that provide high-paying jobs for the citizens of Iowa.



Progress to Date: IGROW Program

Progress: Entrepreneurial Faculty Recruitment



Outcome: The University of Iowa successfully recruited Dr. Mani Subramanian away from the Dow Chemical Company (where he was Global R&D Director) to serve as Director for UI Center for Biocatalysis and Bioprocessing.

This extraordinary opportunity allowed the U of I to recruit a proven, industry-savvy individual as a faculty entrepreneur.

New Life Sciences Incubator at Oakdale Research Park

- Collaborative Project Involving Dermacia-NGI, Ryan Companies, OPN Architects, University of Iowa, UI Oakdale Research Park, City of Coralville and IDED
- Joint Incubator/NGI Facility
- UI provides temporary space to Dermacia-NGI until Incubator/NGI facility is completed
- GIVF and Battelle Funds make this possible



DERMACIA®

ngiTM

National Genecular InstituteTM | Extending and Improving the Quality of LifeTM





National Genecular Institute™

The University of Iowa

Oakdale Research Park Joint Use Facility

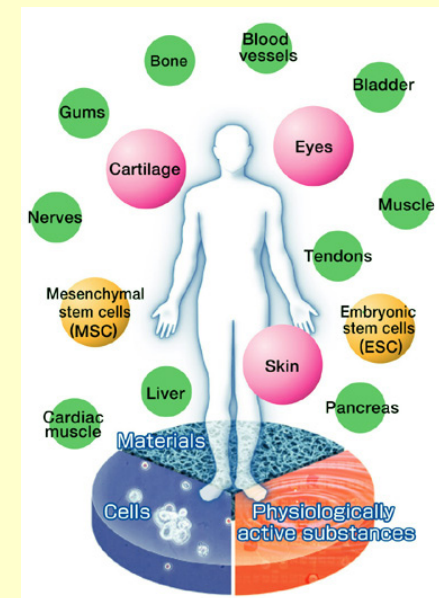


Who is NGI™?

NGI™ is a new brand of biotechnology company where transdisciplinary research meets the market

Advancing:

- Customized Regenerative Molecular Medicine
- Prediction and Prevention of complex human disease
- Development of broad theranostics solutions
 - devices/tools
 - pharmacogenomics



National Genecular Institute™ R&D Priorities



Diversification of research into multiple quadrants allows for sustainable long-term growth.

Specific Areas of Research



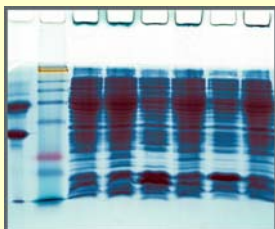
Stem Cell

- Primarily Adult stem cell, but also approved embryonic stem cell research



Systems Biology Research

- Solutions derived from complex interactions of gene, protein and cell processes

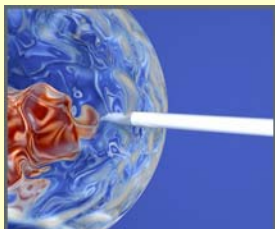


Medical Devices

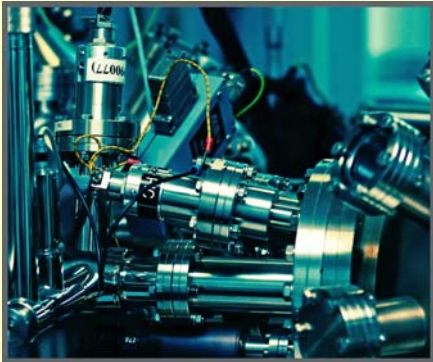
- Photonics, Automation, Imaging and Sample Collection

The BioTrust™

- The foundation of 21st century customized medicine



The BioTrust



- NCI is creating the largest known tissue and genetic storage facility
- When completed, the BioTrust™ will be the most sophisticated and virtually inexhaustible research tool ever devised
- It represents a resource for NCI and third party research studies in customized medicine and complex disease diagnosis and treatment

Locating to Iowa

Financial Incentives

- State and Local agencies provide substantial inducements to relocate and grow business within the state.

Bringing more companies to Iowa

- The ORP project is a strong statement of the region's commitment to bring additional companies.

Working with U of I & other area businesses

- Collaboration is key to the mutual success of companies.

Cost of Living and Standard of Living

- Critical consideration when recruiting top candidates for NGI™



Scope and Scale of Iowa Presence

Facilities

Interim Space
ORP Lot 1
Northgate Park



Talent

Recruiting to Iowa
Drawing from within Iowa
On-site specialty Training



Job Creation Trajectory

High quality
Sustained growth

The Spirit of Collaboration

- The State of Iowa
- The University of Iowa
- Local Municipalities
Coralville, Iowa City
- Shared space promotes interaction between
public and private operations





New Life Sciences Incubator: Collaborative Project

- University of Iowa
- City of Coralville
- Ryan Companies
- Dermacia-NGI
- OPN Architects
- UI Oakdale Research Park
- IDED
 - Task Force benchmarked other parks, incubators

Innovative

Public/Private Partnership

- Partnership model
 - Research Park ground lease to Ryan
 - Ryan coordinates design and construction
 - Ryan leases space to UI/NGI
 - UI purchase opportunity
- Project goals
 - Multi-tenant model
 - Cost versus value maximization
 - Shared risk/reward: Ryan, UI, NGI, State and City
 - Support of Research Park objectives
- Schedule



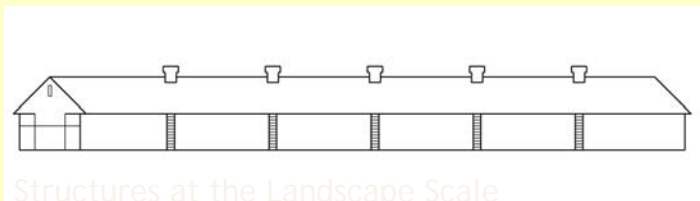
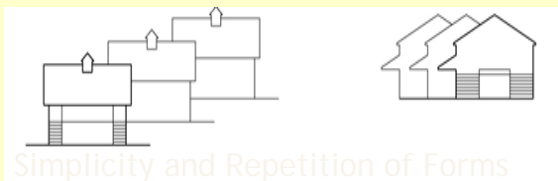
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INNOVATE

PARTICIPATE

Building Placement:

1. Clustering of buildings create districts/ neighborhoods within campus, promoting community interaction and giving identity to different areas.
2. Orthogonal siting provides clarity to the building organization within the background of circulation and landscape frameworks.







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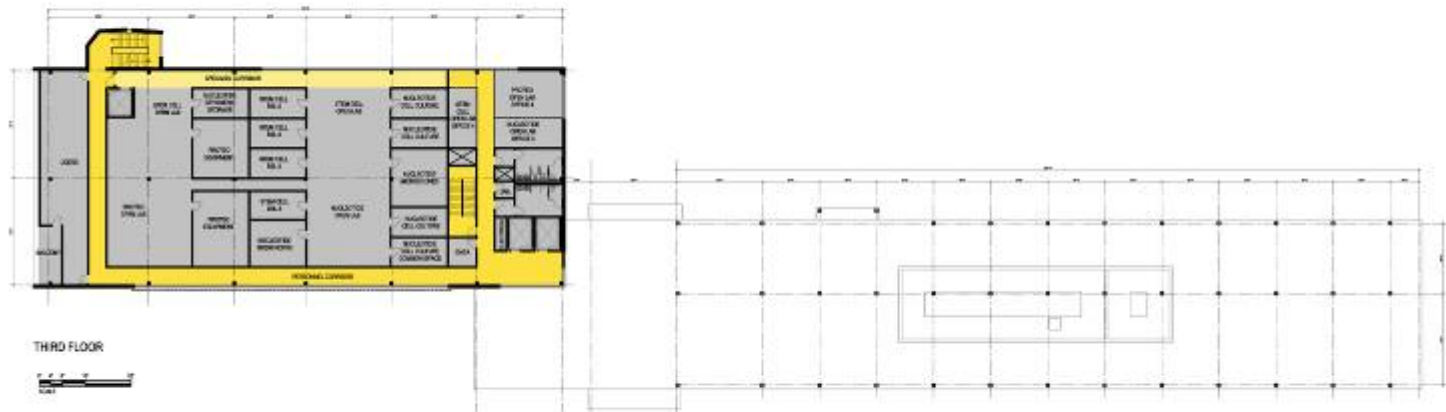
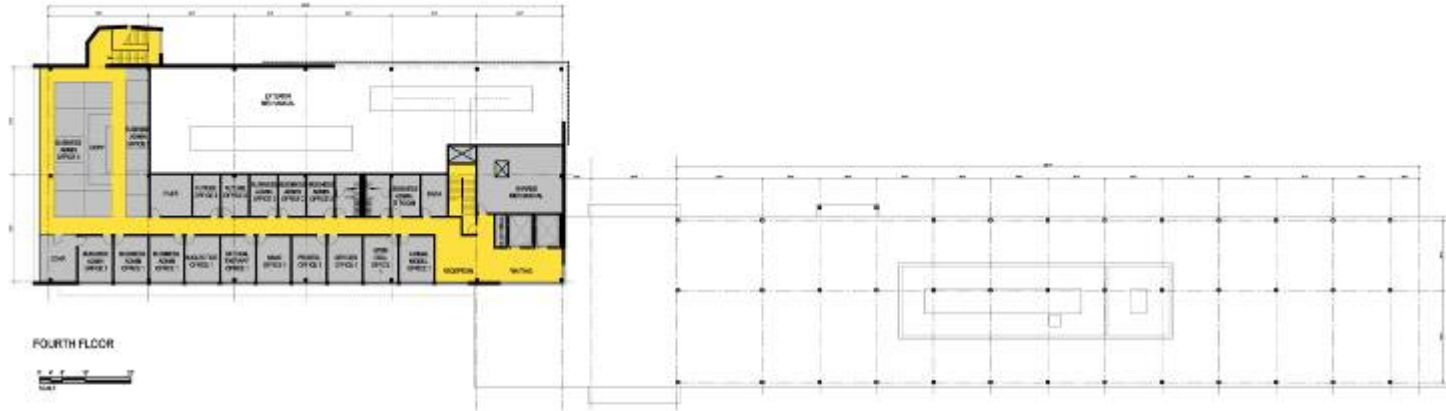
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SCHEMATIC FLOOR PLANS
U of I INCUBATOR + NGI FACILITY
OAKDALE RESEARCH PARK

12.13.06





SCHEMATIC FLOOR PLANS

U of I INCUBATOR + NGI FACILITY
OAKDALE RESEARCH PARK

12.13.06

OPN
ARCHITECTS



RYAN
ARCHITECTS



How are the Battelle Monies Appropriated used at the University of Iowa?

- The total “Battelle” appropriation in FY2007 to The University of Iowa was \$8.41M.

\$2,000,000

For creation of an endowed entrepreneurial professorship- and/or to attract world-class, entrepreneurial talent in the core Battelle platforms.

\$2,720,000

To develop a new Technology Incubation Center and Research Park at the Oakdale Research Campus.

\$3,690,000

For continued investments in the development of core platforms and expansion of the “Gap/Seed Fund” program.



Battelle Projects

- ✦ Platform Proposals
 - ✦ Transgenic Cells for targeted therapy (RepGenix)
 - ✦ Peptides for Cancer Diagnosis and Treatment (BioSynthema)
 - ✦ Neuro-Musculoskeletal Training System (StandAide)
 - ✦ Bio-Imaging for FDA Clinical Trials (VIDA Diagnostics)
 - ✦ Swine Models of Human Disease (TransOva Genetics)
 - ✦ Development of Cancer Therapeutic
 - ✦ Immune System Stimulators and Suppressors
 - ✦ Renovation of Laboratory Space for Center for Advanced Drug Development (Early Temporary Occupancy by NGI)
 - ✦ Simulated Human (Rockwell collaborator)
- ✦ Projects Leveraged ~10:1 with Federal, Private Support



Some Early Returns on Investment

- ✦ NGI projects 178 jobs after three years of operation at their full site
- ✦ Optherion expects to close on substantial Round A Venture Capital Investment in next few weeks
- ✦ ASL Analytical \$1M STTR Grant from NIH for further development of the technology leading to commercialization

SANTOS/Virtual Soldier Research Program

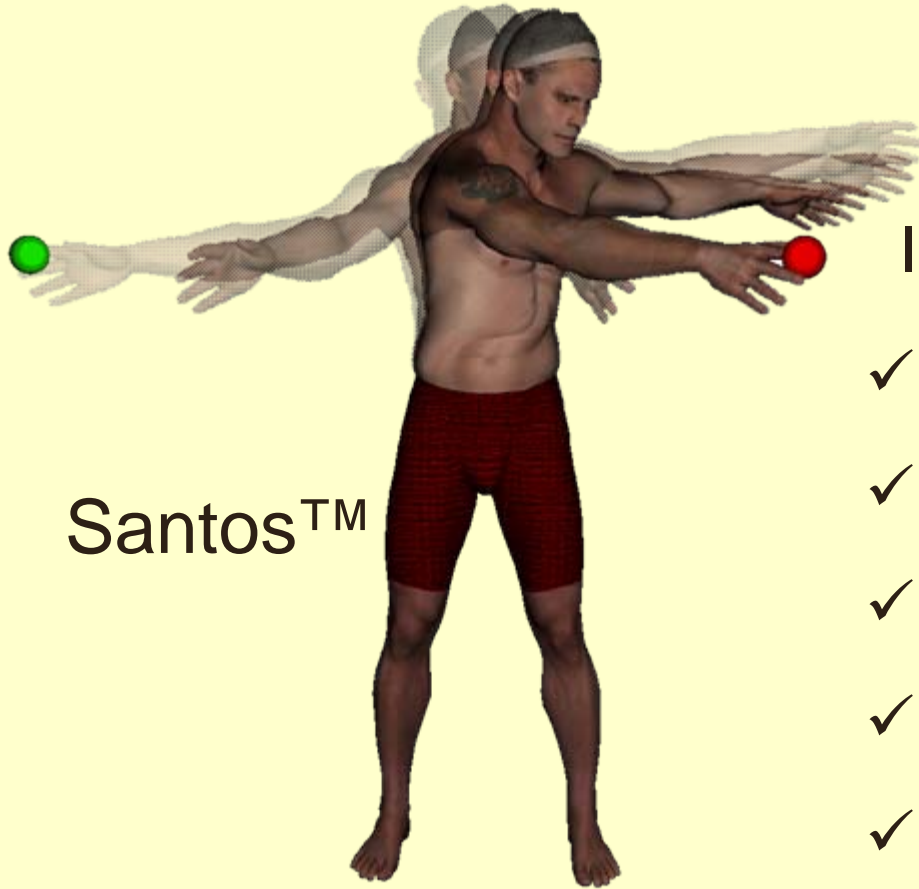
Karim Abdel-Malek, PhD

Director, Center for Computer Aided Design

Director, US Army Virtual Soldier Research Program

Professor, Biomedical and Mechanical Engineering

- Who is Santos™
- Research at the Virtual Soldier Research Program
- Commercialization process and Battelle Platform



Santos™

Introducing Santos™

- ✓ A Virtual Soldier
- ✓ Intelligent!
- ✓ Biomechanically accurate
- ✓ Simulates human motion
- ✓ Predicts behavior
- ✓ Physics-based



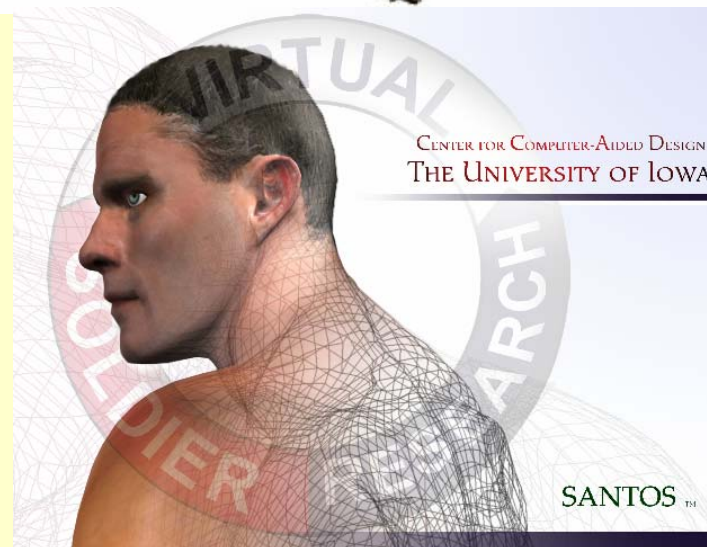
Objectives

To develop a realistic digital human model with intelligent behavior

Answers!!

- o Can you test this system?
- o Can you access this part?
- o What is your discomfort level?
- o Can you assemble this system?
- o Can you carry this armament?
- o How do you 'feel' about this task?

Santos™



Faculty

Staff

Scientists

Graduate students

Undergraduate students



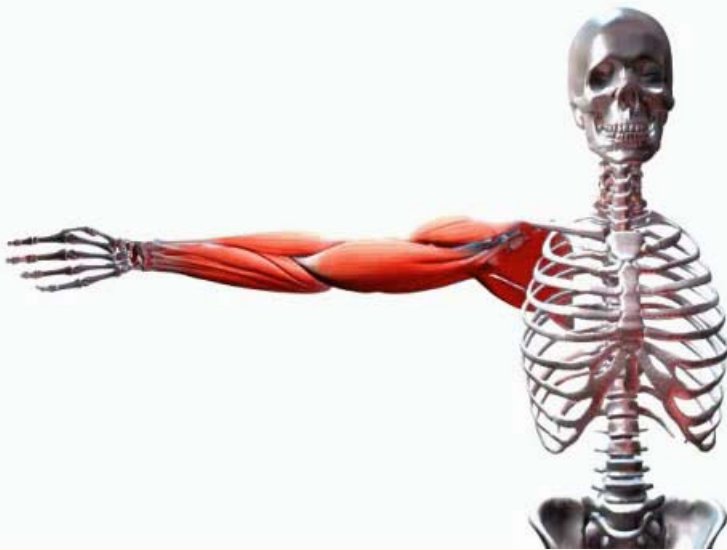
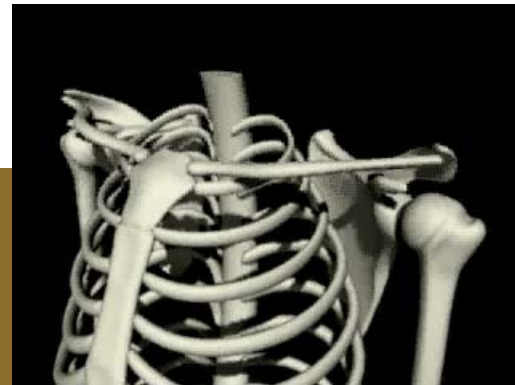
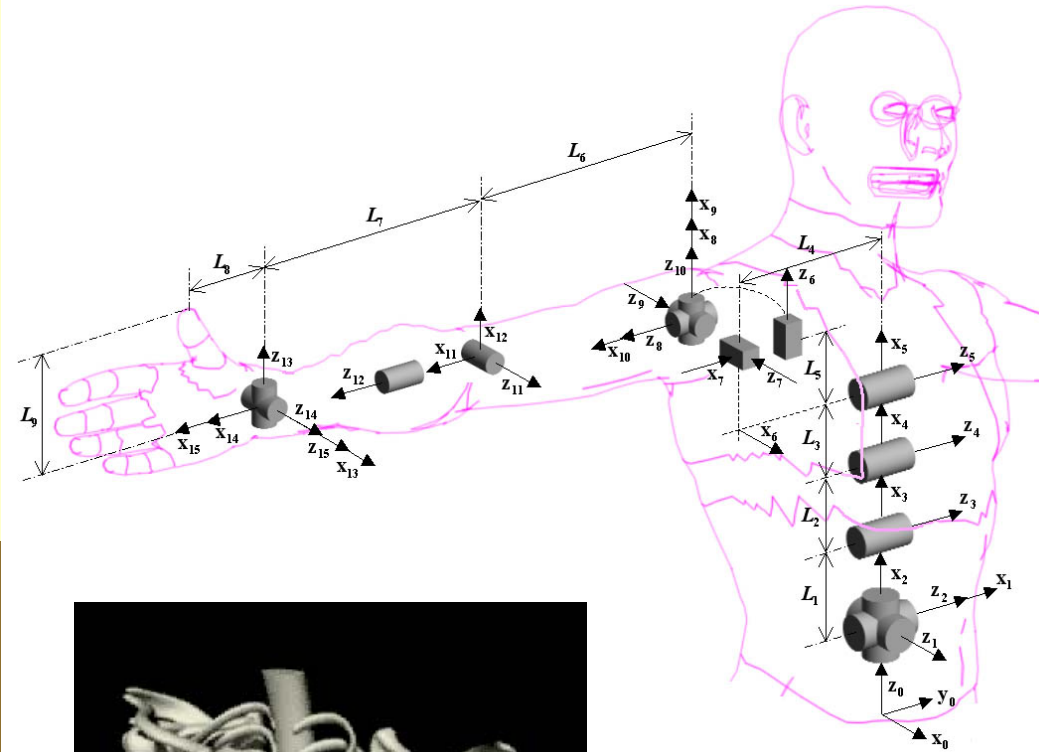
15 open positions

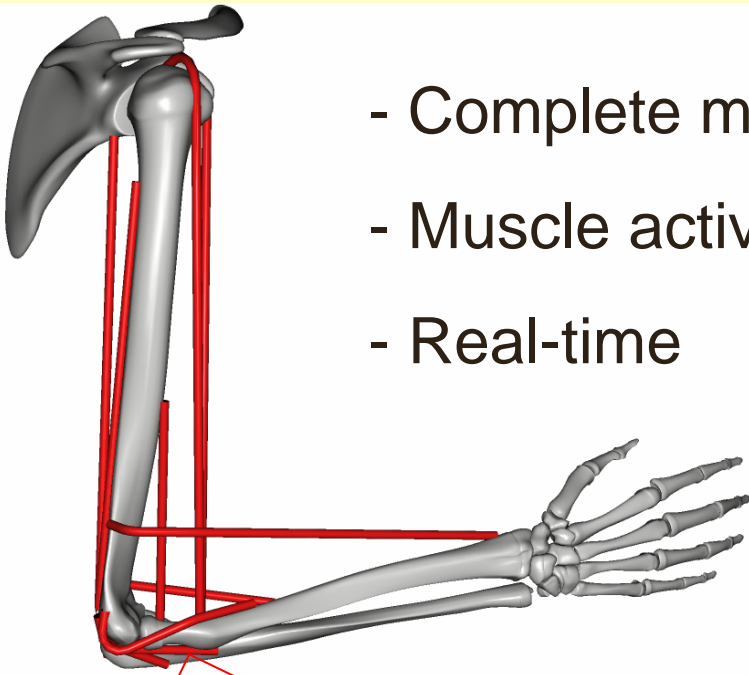
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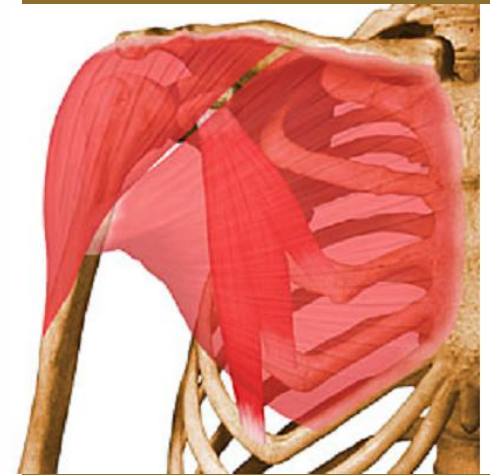
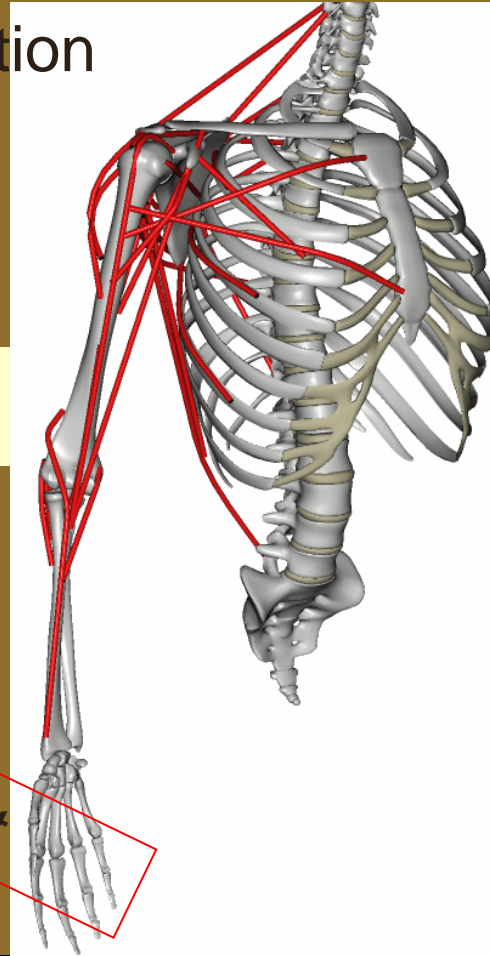
- ✓ High DOF Realistic Model
- ✓ Variable anthropometry (size)
- ✓ Musculoskeletal model
- ✓ Human performance measures

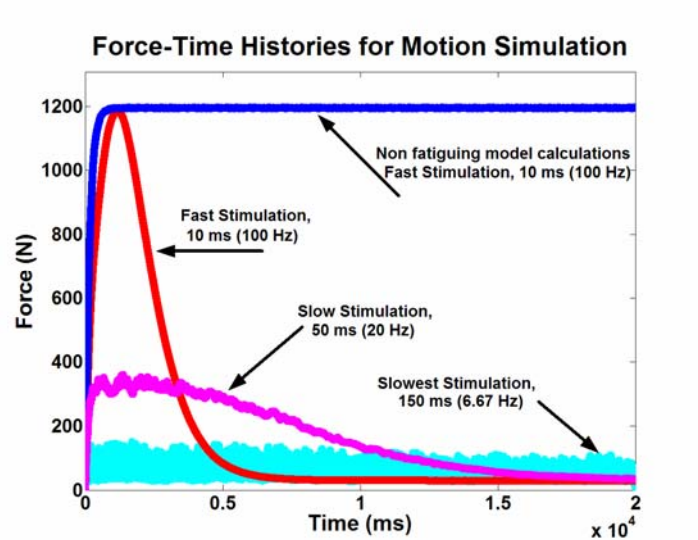




- Complete muscle system
- Muscle activation
- Real-time

Significant Development

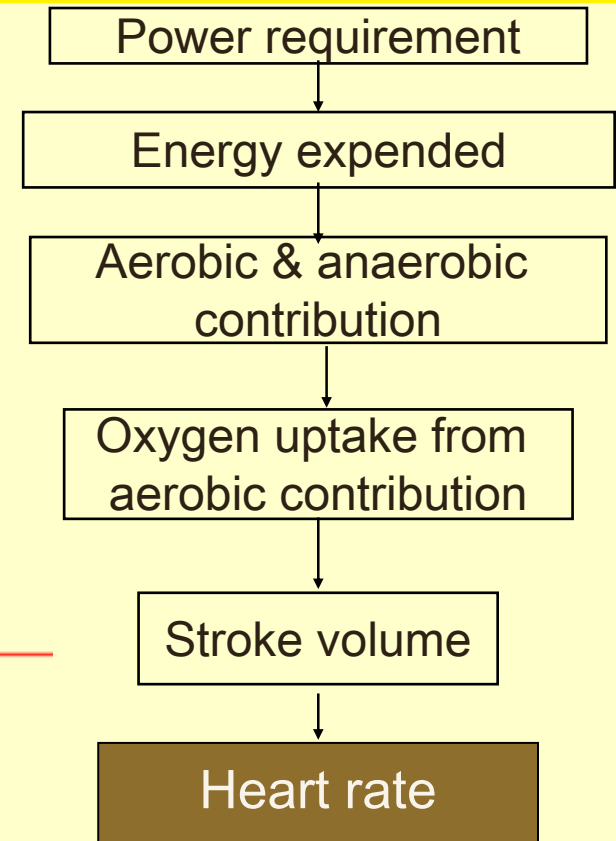
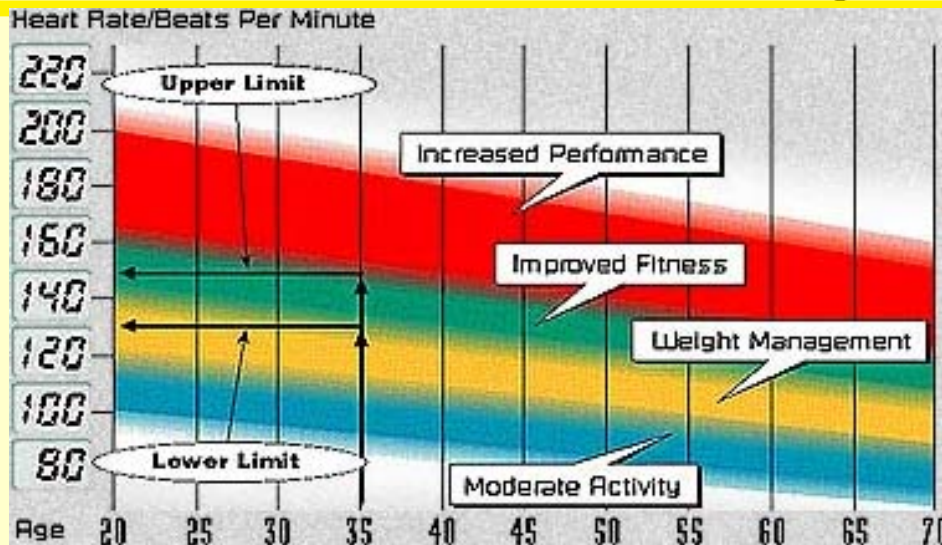




Video

- Activation Dynamics equations
- Force Dynamics equations
- Calcium influx
- How long can you do this task for?





Vital signs

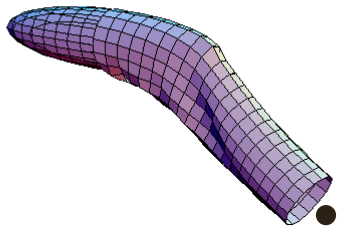
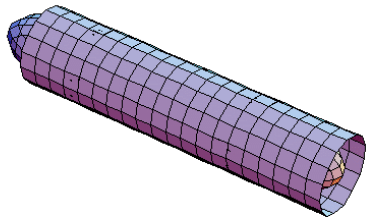
- ✓ Pulse and heart rate
- ✓ Temperature
- ✓ Respiration rate (rate of breathing)
- ✓ Blood pressure (Not considered a vital sign)

Predictive Dynamics™

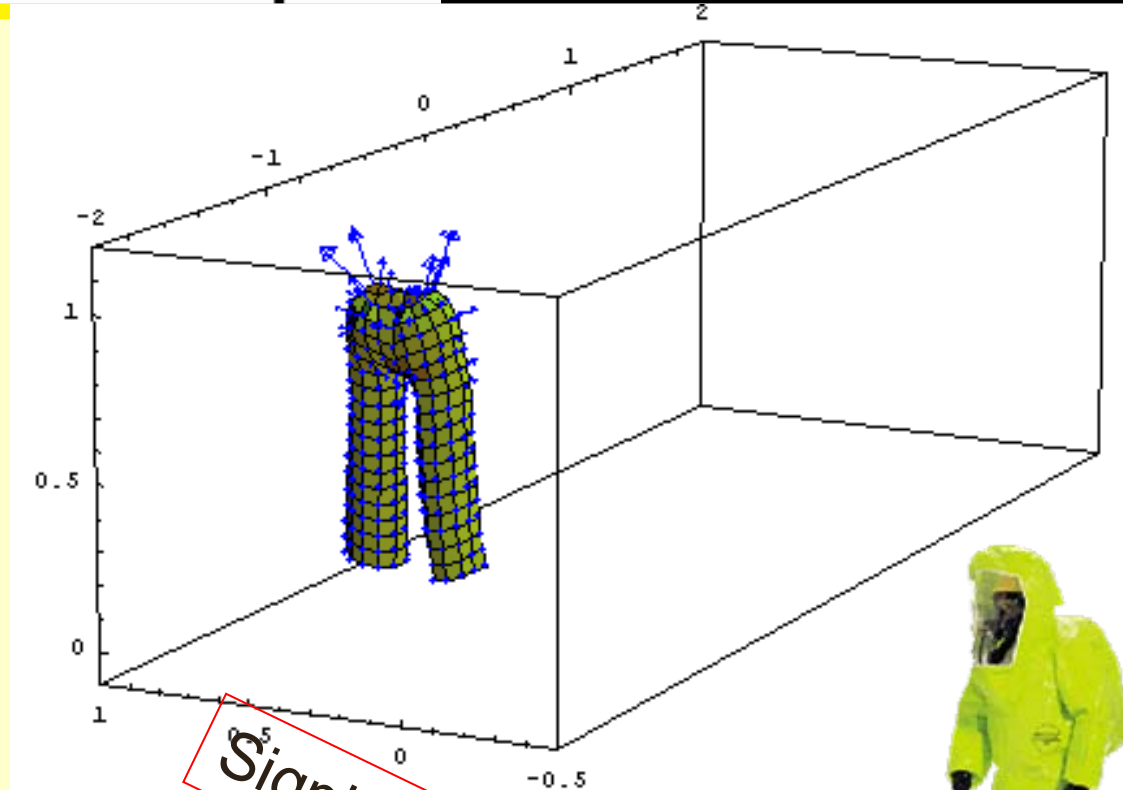


Santos™

Significant Development



- Cloth Modeling
- Numerical Models
- Nuclear, Biological, and Chemical



Significant Development

Example Program

- Upper & lower extremity armor needed
- Military seeks new material, armor configuration
- Military must test new designs
- Military seeks human simulator
- Santos™ is drafted



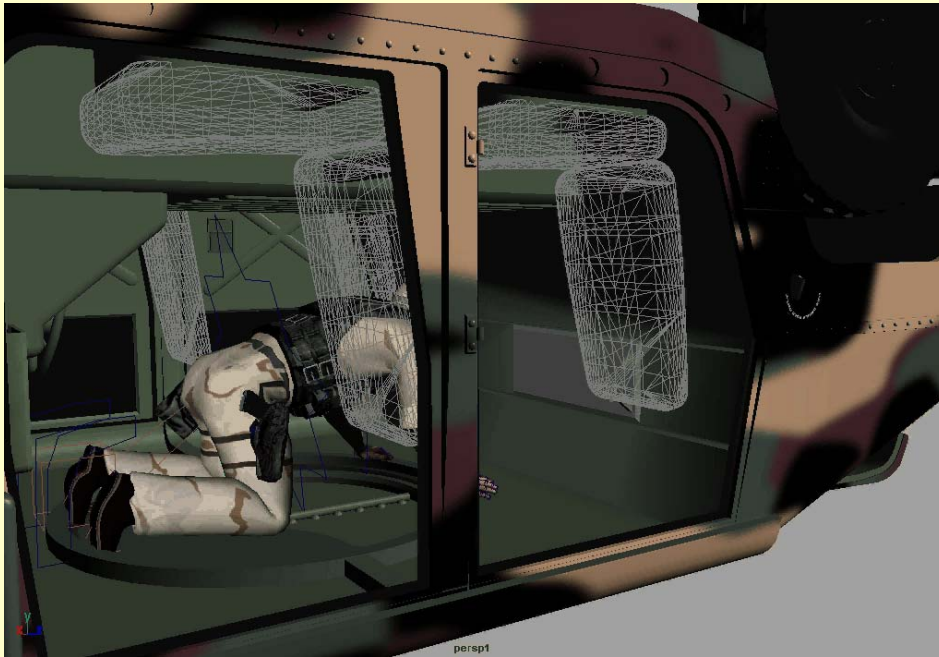
The US Army

Body Armor Simulator (BAS)

- System helps design armor
- System simulates soldier
- Task performance
- Evaluates armor configurations
- Tradeoff analyses
- Saves significant costs
- Saves time



Example Program



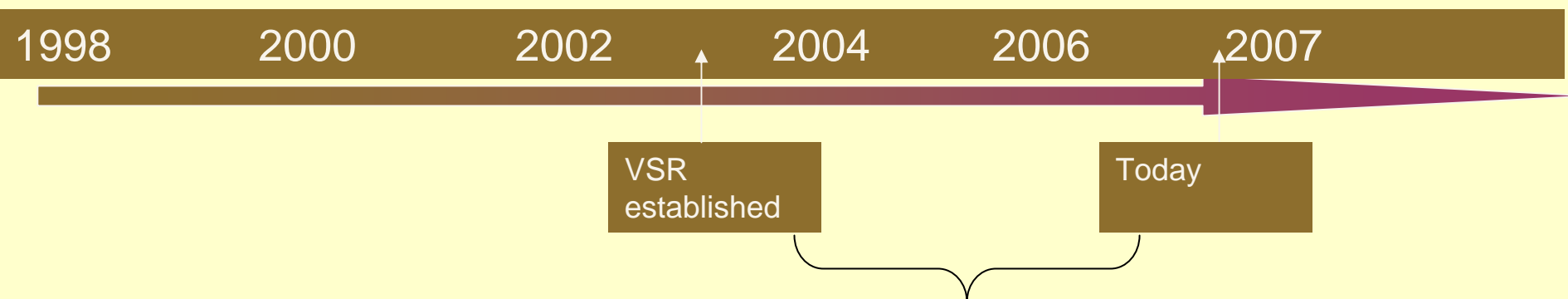
- IEDs in Iraq
- Egress problems



US Army
TACOM



It all began at Iowa...



\$13M external funding
35 new positions + recruiting 12 additional



Mira



Tony



Ella

Dieter



Santos

Sophia

Leveraging Iowa Battelle Platform Funding



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PARTICIPATE



The Future!



EDUCATE

INNOVATE

PARTICIPATE



US Army TARDEC



tank_persp1



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Strategy

- ✓ Commercialization is in process
- ✓ Strategic partners that add value to Santos™
- ✓ Advanced research will continue at VSR
- ✓ Plans are to launch the technology worldwide
- ✓ Looking for employees & researchers



We need your help!

Leveraging Iowa Battelle Platform Funding

Santos Fatigue

Santos Advanced Posture

Santos Dynamics

Santos Virtual

Santos Ergonomics

Santos Strength

Santos Clothing

Santos Gait

Santos Soldier

Santos Thermal

Santos Physiology

Santos Muscles

Santos Motion Capture

Santos Hand

Santos™ Suite of Products

Santos
Engine



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Thank you



www.digital-humans.org

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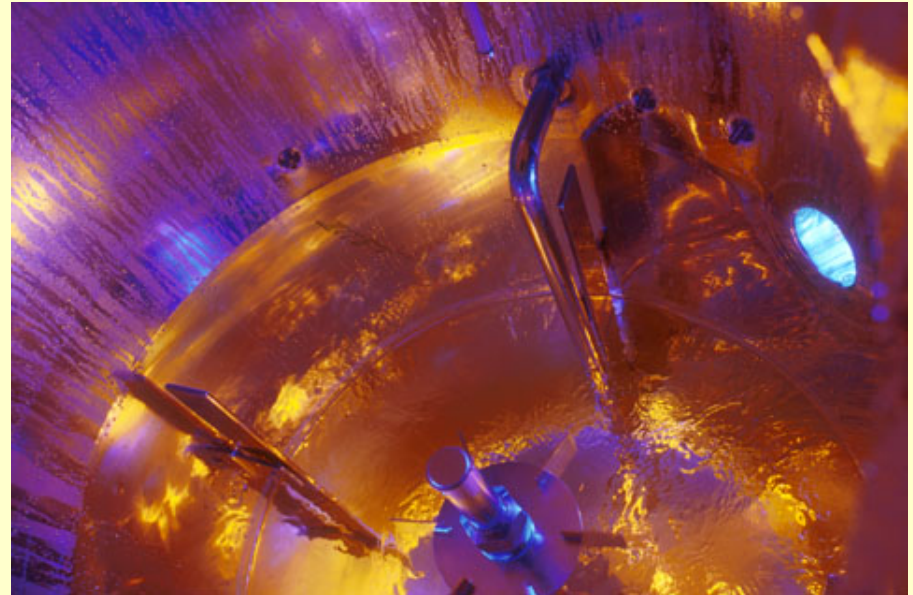
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Importance of Funds

- ✦ Both GIVF and Battelle funds used in concert
- ✦ Without continued GIVF support the short-term progress we have made will not be able to be sustained

Contact Information:
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A view inside one of the fermentors at the Center for Biocatalysis and Bioprocessing